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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
08/902,133	07/29/1997	LEONARD FORBES	303.356US1	9876

7590 10/08/2004  
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EXAMINER
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ECKERT II, GEORGE C

ART UNIT	PAPER NUMBER
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2815

DATE MAILED: 10/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 08/902,133	<b>Applicant(s)</b> FORBES ET AL.	
	<b>Examiner</b> George C. Eckert II	<b>Art Unit</b> 2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 18 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 2-6,8-10,12-15,18-20,28,29,32,34-37 and 39-78 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2-6,8-10,12-15,18-20,28,29,32,34-37 and 39-78 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 June 1997 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>01/18/04</u> <u>6/21/04</u> | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after allowance or after an Office action under *Ex Parte Quayle*, 25 USPQ 74, 453 O.G. 213 (Comm'r Pat. 1935). Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, prosecution in this application has been reopened pursuant to 37 CFR 1.114.

Applicant's submission filed on June 18, 2004 has been entered.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claim 72 is rejected under 35 U.S.C. 102(e) as being anticipated by US 5,546,351 to

Tanaka et al. Tanaka et al. teach, with reference to figure 1, a memory device comprising:

an array of memory cells 1, each cell comprising:

a source, channel and drain in a substrate and a means for storing charge (col. 7, lines 52-54 teaching that the memory array 1 comprises EEPROMs which inherently have sources, drains and channels therebetween, the EEPROMs further including a floating gate which is a means for storing charge); and

a row decoder 5;  
a column decoder 3;  
a command and control circuit 2; and  
a voltage control circuit 7.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 2-5, 9, 10, 12-14, 20, 28, 29, 32, 34-36, 40, 45, 51, 57, 65, 73, 75 and 77 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 4,507,673 to Aoyama et al. in view of US 5,614,748 to Nakajima et al. Regarding e.g. claim 29, Aoyama et al. teach, with reference to figure 6, a memory cell comprising:

a storage electrode 5 comprised of SiC, which has a smaller electron affinity than polycrystalline silicon, to store charge;

an insulator 4 adjacent to the storage electrode, wherein a barrier energy between the insulator and the storage electrode is less than approximately 3.3 eV; and

a control electrode 7 separated from the storage electrode by an integrate dielectric 41.

Aoyama et al. do not teach a specific material for integrate dielectric 41 nor that the integrate dielectric has a permittivity higher than that of silicon dioxide. Nakajima et al. teach in figures 3A-F a memory device having an ONO layer 10 between floating gate 8 and control gate

12. It is inherent that the ONO layer has a permittivity higher than that of silicon dioxide. Aoyama et al and Nakajima et al are combinable because they are from the same field of endeavor (e.g. see US 5,698,879 to Aritome et al., col. 7, lines 39-40). At the time of the invention it would have been obvious to a person of ordinary skill in the art to form the device of Aoyama et al using the ONO layer as an integrate dielectric. The motivation for doing so, as is taught by Nikajima et al., is that ONO films have small leakage current and superior film thickness controllability (col. 3, lines 45-46). Therefore, it would have been obvious to combine Aoyama et al. and Nakajima et al. to obtain the invention of claims 2-5, 9, 10, 12-14, 20, 28, 29, 32, 34-36, 40, 45, 51, 57, 65, 73, 75 and 77.

Regarding e.g. claims 2 and 12, Aoyama et al. teach that the storage electrode is SiC so that the barrier energy is less than 3.3 eV. Regarding e.g. claims 3-5 and 13, because Aoyama et al. and Nakajima et al. make obvious the structure of claim 2, the functions of claims 3-5 are considered inherently taught by the structure. Regarding e.g. claims 9, 10, 14 and 20, Aoyama et al. teach that the storage electrode 5 is isolated from conductors and semiconductors (col. 5, lines 6-7) and is capacitively coupled to a channel (inherent). Regarding e.g. claim 28, Aoyama et al. also teach the device having source 2 and drain 3 regions.

4. Claims 45, 59 and 69 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aoyama et al. in view of Nakajima et al. and US 6,324,101 to Miyawaki. As discussed above, Aoyama and Nakajima make obvious the memory devices of claims 45, 59 and 69 but do not expressly teach that the capacitance between the floating gate and control gate is greater than the capacitance between the floating gate and the substrate. Miyawaki teaches, in figure 5A, a

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memory device wherein the capacitance between the floating and control gates is greater than the capacitance between the floating gate and the substrate. Aoyama and Nakajima are combinable with Miyawaki because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to form the device made obvious by Aoyama and Nakajima further having the structure and capacitance relations as taught by Miyawaka. The motivation for doing so, as is taught by Miyawaka, is that such structure provides a more stable write operation (col. 8, lines 34-53). Therefore, it would have been obvious to combine Aoyama and Nakajima with Miyawaki to obtain the invention of claims 45, 59 and 69.

5. Claim 71 is rejected under 35 U.S.C. 103(a) as being unpatentable over Aoyama and Nakajima as applied to claim 32 above, and further in view of US 5,546,351 to Tanaka et al. As discussed above, Aoyama and Nakajima make obvious the structure of claim 32 but do not teach the device further comprising the circuit apparatus as well. As also discussed above, Tanaka teaches the claimed circuit elements.

Aoyama and Nakajima are combinable with Tanaka because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to form the device made obvious by Aoyama and Nakajima further having the circuit elements taught by Tanaka. The motivation for doing so, as is taught by Tanaka, is that such circuit elements allow the memory device to be used in a variety of modes including data write, data read, data rewrite and verify read (col. 7, lines 52-67). Therefore, it would have been obvious to combine Aoyama and Nakajima with Tanaka to obtain the invention of claim 71.

### ***Double Patenting***

6. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

7. Claims 2-6, 8-10, 12-15, 18-20, 28, 29, 32, 34-37 and 39-78 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-53 of U.S. Patent No. 6,031,263. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of the '263 patent are more narrow than the instant claims and thus anticipate the instant claims.

8. Claims 2-5, 9, 10, 12-14, 20, 28, 32, 34-36, 40, 45, 47, 49, 51, 57, 59, 65, 69, 72, 73, 75 and 77 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 36-39, 59-61, 71-85, 98 and 99 of copending Application No. 09/691,004. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of the '004 application are more narrow than the instant claims and thus are anticipatory.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

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9. Claims 2-5, 9, 10, 12-14, 20, 28, 32, 34-36, 40, 45, 47, 49, 51, 57, 59, 65, 69, 72, 73, 75 and 77 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-5, 8-15, 22, 24-29, 31-35, 37-48, 50-53 and 55-57 of copending Application No. 08/903,486. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims in the '486 application are to a species of device that anticipates the instant claims by providing a floating gate and insulator such that the barrier energy between them will be less than 3.3eV.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

10. Claims 2-5, 9, 10, 12-14, 20, 28, 32, 34-36, 40, 45, 47, 49, 51, 57, 59, 65, 69, 72, 73, 75 and 77 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 10-31 of U.S. Patent No. 5,886,368. Although the conflicting claims are not identical, they are not patentably distinct from each other because the instant claims cite a broad genus that is anticipated by the species claimed in patent '368.

11. Claims 2-6, 8-10, 12-15, 18-20, 28, 29, 32, 34-37 and 39-78 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-37 of U.S. Patent No. 6,249,020. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of the '020 patent are drawn to a memory device having specific materials which anticipate the instantly claimed device.




***Conclusion***

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to George C. Eckert II whose telephone number is (571) 272-1728. The examiner can normally be reached on 8:00 - 5:30, alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
**GEORGE ECKERT**  
**PRIMARY EXAMINER**